

CLAIMS

1. A laser processing apparatus for irradiating a wafer-like object to be processed with first laser light while locating a light-converging point within the object so as to form a modified region by multiphoton absorption within the object, the apparatus comprising:

a condenser lens for converging the first laser light and second laser light for measuring a displacement of a laser light irradiation surface of the object onto the object on the same axis; and

light-converging point position control means for regulating a position of the light-converging point of the first laser light within the object by detecting reflected light of the second laser light reflected by the laser light irradiation surface.

2. A laser processing apparatus according to claim 1, wherein the laser light irradiation surface is a surface of the object on the condenser lens side; and

wherein the light-converging point position control means regulates the position of light-converging point of the first laser light such that the position of light-converging point of the first laser light is at a predetermined depth from the surface on the condenser lens side.

3. A laser processing apparatus according to claim 1 or 2, wherein the light-converging point position control means regulates the position of light-converging point of the first laser light within the object by changing a distance between the condenser lens and the object.

4. A laser processing apparatus according to one of claims 1 to 3, wherein a filter transmitting the reflected light of the second laser light but blocking reflected light of the first laser light reflected by the laser light

irradiation surface is provided on the optical path of the reflected light of the second laser light.

5. A laser processing apparatus for irradiating an object to be processed with first laser light so as to process the object, the apparatus comprising:

5 a condenser lens for converging the first laser light and second laser light for measuring a displacement of a laser light irradiation surface of the object onto the object on the same axis; and

light-converging point position control means for regulating a position of a light-converging point of the first laser light with respect to the object by detecting reflected light of the second laser light reflected by the laser light irradiation surface.

10 6. A laser processing method of irradiating a wafer-like object to be processed with first laser light while locating a light-converging point within the object so as to form a modified region by multiphoton absorption within the object; the method comprising the steps of:

converging the first laser light and second laser light for measuring a displacement of a laser light irradiation surface of the object onto the object on the same axis; and

20 regulating a position of the light-converging point of the first laser light within the object by detecting reflected light of the second laser light reflected by the laser light irradiation surface.

7. A laser processing method of irradiating an object to be processed with first laser light so as to process the object; the method comprising the steps of:

25 converging the first laser light and second laser light for measuring a displacement of a laser light irradiation surface of the object onto the object on

the same axis; and

regulating a position of the light-converging point of the first laser light with respect to the object by detecting reflected light of the second laser light reflected by the laser light irradiation surface.